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## RESPONSES TO COMMENTS ON THE DRAFT 2010 SFER – VOLUME I, CHAPTER 3A

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Grover G. Payne<sup>1</sup> with Chapter Co-Authors

### **Accountability Review**

**Comment:** On page 3A-14, a link to more information about the monitoring projects is provided. Upon searching this link, it is noted that there have been a number of changes in monitoring projects over the years, such as ending C111D and ENP in 2007 and initiating PIE and PIN. The exact nature of the changes is not described, thus leading to uncertainty regarding consistency of DBHYDRO data. Have the changes in C111D and ENP affected the consistency of the data employed to perform the EPA standard violations? The re-engineering of the monitoring program, it was hoped, would address how to better document and convey consistency of water quality data, used for standard violation assessments, in future SFER reports.

**Response:** *The re-engineering of the monitoring program has helped establish a consistent core dataset that is available for use as the basis for the standard violation assessments. However, as restoration activities continue, project specific monitoring programs are initiated and terminated in conjunction with project activities. These projects are generally short-lived, and in an attempt to maintain a consistent dataset from year to year, the data from these projects are not typically included in the annual assessments.*

**Comment:** It would be helpful to add a sentence in the opening ‘Methods’ section (after line 290) to prepare the reader to better understand the sections of the report that describe data sources and screening procedures. A statement such as the following is offered as an example of what is meant: “In performing the annual assessment of water quality standard violations and long-term trends, in as efficient manner as possible, a network of sampling sites have been identified from existing project networks, monitored for difference purposes, to supply the needed data. To insure that this data is consistent from year-to-year and is of high quality, available data must be carefully screened for consistency and accuracy.”

**Response:** *The following sentence can be added for clarity: “In order to efficiently assess the annual water-quality standard violations and the long-term trends, a network of sampling sites has been identified. These sites are part of existing project networks, and they are monitored for different purposes. To ensure that the data are of high-quality and are consistent from year-to year, the available data are carefully screened for consistency and accuracy.”*

**Comment:** If there is a general limitation on interior sites to monthly sampling (page 3A-14, line 342), the interior site category will never be annually evaluated with the binomial hypothesis test evaluation method. On the other hand, the ‘inflow’ and ‘outflow’ categories will almost always be evaluated, annually, by the binomial method unless there is no flow for extended periods of time (thus dropping the number of samples below the 28 required). Does this standard evaluation method bias for categories, based on sampling frequency, introduce bias and/or inconsistency into the conclusions? In addition, does the use of a five-year

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<sup>1</sup> Florida Department of Environmental Protection, Division of Environmental Assessment and Restoration, Restoration Planning and Permitting Program, Tallahassee, FL

excursion rates (line 466) satisfy the ‘annual’ assessment requirements of the Everglades Forever Act? Or is this considered an additional evaluation over and above the raw score method? Which method, five-year excursion rates or raw score, meets the requirements of the law?

**Response:** *While the interior sites are generally sampled monthly (12 times per year), the analysis is not performed on individual sites. As described in the text, sites within each portion of the EPA are grouped by category (i.e., inflow, interior, outflow) with the analysis performed on the combined data from all sites in that group. Even though the interior sites are sampled monthly, there are a larger number of interior sites, compared to inflow and outflow sites. Since the data from all sites within a category are combined prior to analysis, there are a comparable or greater number of samples for interior sites, compared to the inflow and outflow sites, as can be seen in Table 3A-3. Due to the relatively similar number of samples across the site categories, there is no bias introduced into the analysis method.*

*The Everglades Forever Act does not define the specific analyses required to satisfy the ‘annual’ assessment requirements. Acknowledging the fact that no one single analysis is appropriate for all datasets, the authors have designed the comprehensive set of scientifically rigorous analyses presented in this chapter to satisfy the EFA requirements. Therefore, the compilation of analyses presented in the chapter annually is considered to satisfy the EFA requirement.*

**Comment:** As noted in earlier SFER reviews, many parts of Chapter 3A have exactly the same wording as previous SFERs – only a number here and there changes. For people who are familiar with the wording, can the differences between annual SFERs be highlight in brief at the beginning of the chapter?

**Response:** *A summary of the major findings for the current water year is provided at the beginning of the chapter. This summary also includes a brief discussion of any changes in methodology, etc.*

**Specific questions:**

**Comment 1:** On line 26, only the binomial hypothesis test is listed for testing excursions, but the raw score method is also mentioned in the Methods section. Should the raw score method also be listed for completeness?

**Response 1:** *The use of the raw score method in data limited circumstances can be noted in the text.*

**Comment 2:** On lines 51-52, when observed (measured) pH standard excursions are not considered standard violations, are the standards appropriate?

**Response 2:** *Since the interior of the Refuge is a rainfall dominated soft water system, the statewide alkalinity and pH criteria are probably not appropriate for this unique system. Since the pH excursions in the interior of the Refuge are the result of the natural soft-water conditions, they are not considered violations of standards. The uniqueness of this system is explained in the text. More appropriate Site Specific Alternative Criteria (SSAC) could be developed for pH and alkalinity in the Refuge; however, this would involve considerable time and effort.*

**Comment 3:** Regarding lines 307-308 noting that a consistent group of sampling sites is sought year-to-year, is there also an effort made to utilize a consistent sample size from year-to-year? This question arises from the qualification noted on page 3A-55, lines 1091-1094, where the number and distribution of samples from year-to-year was not maintained, and, thus, impacted the findings from the data. A similar data limitation situation is discussed in

lines 562-564, cautioning about conclusions. The reviewers greatly appreciate such data qualification statements and encourage use of similar explanations in the future where data limitations impact findings and conclusions. Would it be possible to also add a statement after lines 307 and 308 to the effect that consistency in number of samples is also sought, or is this not the case?

**Response 3:** *Clarification will be added as appropriate.*

**Comment 4:** Germain (1998) is listed on line 338 as a description of the current District's monitoring programs. There is no citation in the list of references at the end of the chapter for Germain. In searching the District's website for a copy of the report, the only Germain monitoring report found is from 1994. ([https://my.sfwmd.gov/pls/portal/docs/PAGE/PG\\_GRP\\_TECH\\_PUBS/PORTLET\\_TECH\\_PUBS/DRE-317.PDF](https://my.sfwmd.gov/pls/portal/docs/PAGE/PG_GRP_TECH_PUBS/PORTLET_TECH_PUBS/DRE-317.PDF)). In fact, no reports are listed on the Technical Publications listing for 1996-1999

([https://my.sfwmd.gov/portal/page?\\_pageid=2235,4688729,2235\\_4910099&\\_dad=portal&\\_schema=PORTAL](https://my.sfwmd.gov/portal/page?_pageid=2235,4688729,2235_4910099&_dad=portal&_schema=PORTAL)). Are reports during this time period located elsewhere? Given the monitoring re-engineering updates in the last two SFER's, is Germain (1998) still the most up-to-date description of District monitoring programs?

**Response 4:** *The correct Germain reference was accidentally deleted during the editorial process. The correct reference will be re-inserted in the final version of the chapter.*

**Comment 5:** The webpage referenced on line 346 presents very brief information for each monitoring project and the information is not consistent from one project to the next. Some projects describe changes in the network while others describe purpose only. Is there a source of more detail on the monitoring projects?

**Response 5:** *The authors are not aware of more detailed information available at this time.*

**Comment 6:** Lines 521-524 describe the same problem noted in the 2009 SFER – insufficient data. Will this always be a problem?

**Response 6:** *Yes; the DO SSAC essentially compares the average annual DO concentration at a site with the predicted concentrations based on sampling times and water temperatures. Therefore, there is effectively one annual "sample" per site. Since there are less than 28 sites per area, the use of the annual binomial test is not appropriate; therefore, a five-year assessment period is used.*

**Comment 7:** Is there an effort underway to explain the cause of the DO SSAC excursions reported on in lines 578-582?

**Response 7:** *Since there doesn't appear to be any lasting biological effect of these excursions, there is not a significant effort to explain them at this time. Excursions of the DO SSAC generally occur during periods of limited rainfall when low water levels and relatively stagnate conditions predominate.*

**Comment 8:** What is the cause of the long-term reductions in specific conductance levels reported in lines 631-635? Is there a potential connection to implementation of restoration projects?

**Response 8:** *The source of the elevated conductivities is primarily the pumping of canal/groundwater. The observed reductions in specific conductance levels likely are the result of multiple things including: 1) implementation of agricultural BMPs in the EAA and other areas. These BMP's involve better water management and the retention of more high conductivity water on the farms; 2) reduction of pumping of high conductivity canal water into the EPA; 3) overall reduction of pumping of groundwater; and, 4) climatic changes.*

**Comment 9:** Is the cause of un-ionized ammonia excursions, reported in lines 646-658, being addressed? Or is this a situation caused by low precipitation (and resulting canal discharge decisions) and cannot be remedied?

**Response 9:** *As explained in the text, the un-ionized ammonia excursions were limited to a distribution canal downstream from the S-10 structures. The exceedances occurred during periods of low water levels when the S-10 structures are not used, and the distribution canal becomes stagnant, and the pH increases due to increased production.*

**Comment 10:** In Appendix 3A-5, why are FWMC, for waters from a variety of sources, exactly the same? (For example, 20ppb into WCA1 via S362 from 8 sources.) Is this due to sampling only the mixed waters, not the individual streams?

**Response 10:** *The S362 structure is a discharge from the STAs, which is monitored routinely and used to calculate the 20 ppb FWM concentration provided in the table. The eight sources listed all supply water to the STA in various amounts. Since water ultimately discharged from the STA is a combination of the eight sources and cannot be differentiated, all of the sources are assigned the same concentration.*

**Comment 11:** What ‘comparisons’ are being referred to in lines 1170-1172? I am unable to find a comparison of standards to data in the 2009 SFER, as indicated. I find a similar statement in the 2009 SFER referring to the 2008 SFER, but not what I would refer to as a ‘comparison’. Is the statement about results considered the ‘comparison’? Some clarification is needed.

**Response 11:** *In this case comparison refers to the annual assessments performed. This chapter, for example, utilized monitoring results to characterize general water quality conditions in different portions of the EPA by “comparing” the results with applicable water quality criteria to determine exceedance frequencies, which are then used to classify the level of concern.*

**Comment 12:** In lines 1173-1174, the non-ECP DO data is being compared to Class III DO criteria with numerous excursions beyond the standard noted. What role does the DO SSAC play in determining DO standard violations? Does the DO SSAC not apply to non-ECP waters?

**Response 12:** *Specifically, the DO SAAC only applies to the area within the EPA. The SSAC has not been specified in the non-ECP permit for use in reporting the DO data. The authors will apply the SSAC once the necessary permit modification is made to the non-ECP permit.*

**Comment 13:** The list of construction items provided on Appendix 3A-8-6 is easier to comprehend than the paragraph ‘listing’ in lines 1287-1305.

**Response 13:** *Chapter text will be revised to a bulleted list to make it easier to comprehend.*

**Comment 14:** Was the DO SSAC not employed in the DO assessment described in lines 1377-1384? Again, it appears that the DO SSAC does not apply to the C-111 Canal Project modifications.

**Response 14:** *The SAAC for DO has not been specified in the Emergency Order #9 as a reporting requirement. There was only one sample collected during discharge into the EPA in WY2008 and six samples of the discharge into the EPA in WY2009. Given this data limitation, the SSAC is not appropriate for use at this time. However, the SSAC can be applied in the future if sufficient data become available, and the necessary permit modifications are made.*

**Comment 15:** Is there a reference for the ‘previously identified’ improvement for using auto-samplers in lines 1460-1461? How is ‘improvement’ defined? Given the data presented in lines 1464-1476, is the ‘previously identified’ improvement justified? Clarification is needed.

**Response 15:** *The use of autosamplers is an improvement since they provide flow-weighted composite samples, which capture short-term events (such as storm events) which periodic instantaneous grab samples often miss. The flow-weighted composite samples collected by the autosamplers provide more accurate estimates of the load of various parameters going through the structures.*

### **Integrative Review**

**Comment:** The past two SFERs described an effort to ‘re-engineer’ the South Florida Water Management District’s (SFWMD) water quality monitoring programs - seeking to enhance the scientific soundness of the resulting information while exploring ways to better coordinate loosely connected monitoring ‘projects’ and achieve economic efficiency. There is no update nor mention of this effort in the 2010 SFER. Was this an oversight or has the effort been terminated? The Panel considered the monitoring re-engineering activity a way to carefully examine and understand the strengths and weaknesses of the DBHYDRO data set, in particular, in scientifically supporting the water quality assessments described in Chapter 3A, as well as other chapters of the SFER where water quality conditions are examined.

SFER chapters are, by necessity, focused on portions of the hydrologic system as well as projects to restore the environment of South Florida. However, as the SFER evolves and monitoring systems are better integrated (via a monitoring re-engineering effort?), opportunities to enhance efficiencies in monitoring and reporting should be recognized and used to further enhance the information content of the SFER. This is already happening in Chapter 3A with the division of sampling sites into ‘inflow’, ‘interior’, and ‘outflow’; division of sampling over the years into ‘baseline’ (1979-1993), ‘phase I’ (1994-2004), and phase II (2005-present); and division of standard violation into a ranking of ‘concern’, ‘potential concern’, ‘minimal concern’, and ‘no concern’. The interface of results coming from these divisions is, by design, beginning to permit statements regarding long-term trends in water quality standard compliance, concentrations, and loads that are, potentially, associated with restoration projects (lines 313-315 and lines 352-353). To illustrate, on page 3A-4 (lines 149-150) the effects of restoration activities are noted as improving overall phosphorus conditions in the interior marsh areas of the EPA. Lines 161-164 make similar connections to restoration project impacts on reduced TP loading to the Refuge, WCA-2 and WCA-3. Similar statements are made in other sections of Chapter 3A.

This emerging attempt to connect restoration projects with improved water quality conditions should be expanded in future years as the data becomes available to make stronger connections across Chapters of the SFER. On page 3A-42 tracking of long-term trends in future SFERs is mentioned and on page 3A-5 (lines 170-171) it is noted that additional data will permit more connections to be made. To further elaborate on this point, consider the statement on line 27 in Chapter 8 that ‘Substantial progress’ has been made in reducing phosphorus levels discharged in to the EPA. This statement, although it is not referenced, is probably based on data presented in Chapters 4 and 5. If this ‘progress’ in reducing phosphorus levels could be annually collaborated by Chapter 3A’s standard violations assessments in inflows, interior sites, and outflows, and then, in turn, connected to Chapter 8’s implementation of the Long-Term Plan for achieving water quality goals in the EPA, then the integrative reporting across chapters in future SFERs is greatly strengthened.

Another potential opportunity to further enhance connections between standard violation assessments and restoration project accountability arises from the definition of excursion categories. On page 3A-16 (line 441-442), it is noted that excursions categorized as ‘no concern’ were not discussed further in this chapter. Over time, as sampling sites move from ‘concern’ to ‘potential concern’ to ‘minimal concern’ to ‘no concern’, accountability for restoration activities can be documented. Can the long-term excursion categorization of sampling sites, presenting a trend of ‘concern’ levels over the years, be related to restoration project accountability in restoring water quality conditions in the EPA? In other words, can the annual assessment of standard violations be tied to individual or categories of restoration projects in Chapters 7A, 7B, and 8 for accountability purposes?

It is realized that such an integrative effort may be beyond the scope of Chapters 4 & 5, Chapter 3A, and Chapter 8, as they are currently structured and focused (especially given its the strong regulatory compliance orientation in Chapter 3A). If such an integration of Chapters could be accomplished in the next few years, it may be possible for one annual water quality data assessment to produce two major types of management oriented water quality information: (1) annual standards violations; and (2) tracking restoration success in reducing standard violations (e.g. accountability of the Long-Term Plan discussed in Chapter 8). It is further realized that year-to-year changes in water quality very often greatly overshadow long-term trends, but at some point in the future, the restoration projects will reduce annual water quality standard violations IF they are successful. If restoration project accountability could be tracked without too much additional effort, great efficiency in sampling/analysis/reporting could be achieved, with qualifiers used to insure proper interpretation of the findings (as is now done with the results of Chapter 3A). It was hoped that the monitoring re-engineering project would have examined information strategies of this nature.

**Response:** *As discussed in Chapter 1 of the 2009 SFER, the pilot study for “re-engineering” the District’s water quality monitoring programs was completed in WCA-2. The District is currently evaluating the results obtained from that pilot project and is considering the best ways to implement the findings in WCA-2 and to expand the re-engineering effort to other areas.*

*The Department and District will continue to make every effort to integrate the SFER chapters as suggested in the comment; however, as noted, care must be exercised in attributing short-term trends or changes to implementation of the Long-Term Plan or other long-term restoration activities. While in some cases it is easy to attribute some of the observed water quality changes to specific restoration activities, such as water quality improvements in areas which historically received canal discharges which have been terminated. In many cases, it is much more difficult to link water quality changes to specific restoration projects or to even determine if the changes are related to restoration activities and not a long-term climactic cycle. This is especially true when water quality effects from projects are not realized for extended periods following the completion of the project or multiple projects combine to have the observed effect. The authors will continue to link the observed changes in water quality to restoration activities whenever possible.*